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THE VALUE OF THE WASSERMAN REACTION IN DIAGNOSING AND TREATING SYPHILIS[1]

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This is a large subject, and, as I am not a physician, I realize that to treat the subject theoretically would be a presumption on my part, so I will give a practical outline which may be helpful, not going into the history of the many experiments which have been made.

The Wasserman reaction is one of the most sensitive of laboratory tests, and one that cannot have too much care, as an error one way or the other is most serious. The laboratory worker has no desire to report a serum positive if it is not, or if inhibition is due to any other factor than the presence of a syphilitic infection. On the other hand, it is just as serious to report a negative Wasserman if the patient has syphilis. One negative report can never be relied upon, particularly if the clinical symptoms are suggestive of a specific infection.

Taking the Patient's Blood.—One of the chief factors of success is to know when to take the patient's blood for examination, and when not to. If the patient is under specific treatment, the blood should not be taken for examination until the treatment has been suspended for at least two weeks, as during active anti-syphilitic treatment, the blood may react negatively.

If the patient is an alcoholic, the blood should not be taken during the time or immediately after he has been drinking, as this will cause a false negative reaction.

There are also diseases which sometimes give false positive reactions such as Yaws, Sleeping Sickness, Pellagra and Nodular Leprosy. Pellagra is the only one that is apt to give us any thought on this, and it has been practically denied that Pellagra will cause a positive reaction. Slight positive reactions may occur in Tuberculosis, Measles, and Scarlet Fever. In tubercular patients, the control tube of patient's serum does not, as a rule, show complete hemolysis, and if a tuberculosis fixation is run, usually we get a positive reaction. In the case of Measles or Scarlet Fever it is best to repeat the test when the patient has recovered.

Blood should not be collected after anesthesia or while the patient has a high temperature, as these have a tendency to give a false positive reaction. It is not advisable to take the blood if the patient is taking medicine. Frequently the examination must be repeated if the blood has been taken under these conditions. In most of the diseases yielding a positive reaction, the clinical symptoms are so marked that they may be readily differentiated from syphilis and accordingly the Wasserman is of unequaled and incalculable diagnostic value.

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[1] Read at the fiftieth anniversary meeting of the Southwestern Kentucky Medical Association, May, 1920.

Taking the Blood or Spinal Fluid.—Two factors in taking the patient's blood must always be remembered. The specimen must be collected aseptically into a sterile container. This is especially necessary when there is delay in transmitting the fluid to the laboratory. When sent through the mails from distant points, blood serum will carry better in a small container which is practically full, as when the container is large, with a small amount of blood, agitation takes place which breaks down the red cells.

If the blood is to be examined the same, or the following day, the specimen of blood may be collected in chemically clean but not necessarily sterile containers. Bacterial contamination renders a fluid anticomplementary and unfit for complement fixation tests.

The specimen of blood can be taken in several different ways. In the hospital, the laboratory workers usually take care of this, but it is frequently necessary for the doctor to do it himself.

When patients have to be bled frequently, it is best to use the finger or the ear. Frequently enough blood can be obtained by lancing the finger on the side, holding it over a small tube, and milking the finger. In children the big toe is sometimes used, or the heel, while in very young children, the external juglar or temporal vein must be used.

The Keidel tube is most satisfactory for the general practitioner, as these can be secured sterilized and ready for use. When using one of these, all that is necessary is to cleanse the arm over the median basalic, or the inside of the elbow, with iodine and alcohol. A tourniquet is applied about four inches above the elbow, and the patient is asked to make a hard fist. If the veins are not prominent, by gently slapping the arm over the median basilic, previous to painting with iodine, the flow of blood will be increased and the veins more readily seen. After inserting the needle, the end of the tube which is a rubber connection between that and the needle is crushed and the blood allowed to flow into the tube. The vacuum in the tube causes suction.

Frequently a Record or Luer Syringe is used. A needle can also be used with or without a piece of rubber tubing attached. The blood is allowed to drop directly into the test tube from the needle. If the patient does not bleed freely, the flow of blood can be stimulated by having the patient open and close the hand, making pressure on the palm as the fist is closed.

If a syringe or needle is used, it must be boiled before using. The water should be poured off while boiling, the heat will thus dry the syringe. About 3 to 5 cc. of blood will be required.

One of the great troubles with most specimens sent to laboratories is that frequently hemolysis has to a certain extent taken place. Water always causes hemolysis and, of course, if any moisture remains in the syringe or needle used, it is impossible to prevent this. Hemolysis being the chief factor in running the Wasserman, it can readily be understood why a serum of this kind would be unsatisfactory. Instead of having a nice clear serum to work with, it is red, due to the breaking down of some of the red corpuscles in the patient's blood.

We always mark each serum with the patient's name as soon as it is taken, and if the doctor withholds the patient's name, only using the initials, it is advisable for him to have some record of how these are marked.

Taking of Spinal Fluid for Examination.—Asepsis must be strictly adhered to; a lumbar puncture needle and not a Luer or Record syringe should be used. The fluid must be collected in sterile containers and two test tubes should be used, as the first one may have blood in it. Cerebrospinal fluid which contains blood can be used for the Wasserman, but it is not of any value for a globulin, cell count, or Lang's coloidal gold test.

If the patient is able to sit up, it is well to have him sit on a straight backed chair, facing the back, with the buttocks close to the edge of the chair. If the patient folds his arms over the back of the chair and rests his head on his arms, his back will be well arched.

Using the crest of the ilia as a line, it is easy to locate the fourth lumbar vertebra. The soft spot is found just above this. That is between the third and fourth lumbar vertebræ. There is some little difficulty in entering the wall, but one can easily tell when the needle is in. The trocar is then removed from the lumbar puncture needle, and the fluid is allowed to run out through the canula into a sterile test tube. If the fluid is bloody, use the second tube.

For a Wasserman alone, 2 cc. will be required. If there are to be other examinations, such as cell count, globulin, Lang's coloidal gold test, about 5 cc. will be needed. However, it is not well to remove too much, as the patient frequently suffers with severe headache following a lumbar puncture.

If the patient is in bed, he may lie on his side with the back close to the edge of the bed. The knees are drawn up, with the head and shoulders drawn forward.

The Interpretation of the Wasserman Report.—This is the next thing the physician has to consider; and it is most important that he shall take the following into consideration.

Primary Syphilis or Period of Chancre.—As would be expected, a certain degree of tissue change must occur before syphilis reagin occurs in the blood. The Wasserman reaction in primary syphilis depends upon the virulence of the infection. A positive reaction may be secured during the first week after the appearance of the chancre. Craig has reported a positive reaction, five days after the initial lesion. In general, in primary syphilis the Wasserman will be positive in about 80 or 90 per cent. of cases. Craig has reported 34 per cent positive reactions during the first week after the appearance of the chancre; 57 per cent during the second week; 67 per cent during the third week; 76 per cent during the fourth week; and 80 per cent during the fifth week.

The cerebrospinal fluid, during the primary stage, has always reacted negatively. It is generally agreed that the diagnosis should be made as early as possible and vigorous treatment instituted. A Wasserman reaction may be performed, and if it shows a positive result, this indicates the presence of syphilis, even if the lesion under suspicion is not specific, the reaction being due to a previous infection.

A negative reaction, however, does not exclude syphilis, and if it is at all possible, a microscopic examination, using the dark ground illuminator, should be made for the treponema. In primary syphilis, a microscopic examination of the secretions of the lesion, by a competent person, is usually more valuable than the serum test. As a general rule, both examinations should be made, especially for patients in whom the chancre is almost healed or is atypical.

Secondary Syphilis.—In untreated cases of secondary syphilis, the reaction is positive in from 92 to 100 per cent. The intensity of the reaction does not bear any relation to the severity of the infection. In secondary syphilis without cerebral symptoms the cerebrospinal fluid is practically always negative. Conversely, cases showing cerebral involvment usually react positively. More recent work has shown that the cerebrospinal system is involved, and that in a relatively large number of cases. That is, about 30 per cent of secondary syphilis give a positive reaction with cerebrospinal fluid.

Tertiary Syphilis.—It is probably in tertiary syphilis that the Wasserman has its greatest value. Lues is responsible for so many diverse clinical conditions that the Wasserman reaction has become almost indispensable as a diagnostic aid. There is no limit to the time following infections in which the positive reactions may not be found. In active tertiary syphilis, untreated, about 96 per cent are positive.

In cases receiving more or less antispecific treatment, the reactions are positive in about 75 per cent. In general, therefore, a positive reaction in tertiary syphilis is found in 80 to 85 per cent of cases.

In a large percentage of cases of syphilitic aortitis, aortic aneurysm, aortic insufficiency, gummas of various organs, the reaction is positive and is of great value.

In general paralysis, paralytic dementia, the serum reacts positively in about 100 per cent of cases. In many other conditions where there has been no treatment, the percentage of positive reactions is very high.

Latent Syphilis.—In cases of latent syphilis (that is, concealed, not manifested) the Wasserman may constitute the only evidence of the existence of the disease and prompt treatment may prevent the development of tertiary lesions. Where the spirochetes are few in number and dormant, there is little tissue destruction or alteration. The reaction of the cerebrospinal fluid depends upon whether or not the central nervous system is involved.

What Is Meant by a Provocatory Stimulation or a Provocative Dose?—Simply this, that antisyphilitic treatment may convert a negatively reacting serum into a positive one. In not a few cases of latent syphilis, reacting negatively, the administration of a specific spirillicidal agent, such as mercury, or salvarsan, is followed by a positive reaction, due probably to the liberation of endotoxins from destroyed spirochetes or to a stimulation of the spirochetes by a dose of drug that did not suffice to kill them.

In cases where lues is known to be present, or is strongly suspected, and the Wasserman is indefinite or negative, the administration of .3-.4 gram of salvarsan, neosalvarsan (or substitutes as arsphenamine, etc.), followed by a Wasserman three days later, may now show a positive reaction and thus indicate a latent syphilis requiring further treatment.

Congenital Syphilis.—In congenital syphilis, the Wasserman reaction depends upon when the examinations are made; the majority of cases act positively. A Wasserman reaction of the mother and of the child at the time of birth, in cases where syphilis of the mother is suspected, has considerable prognostic value. A large majority of children reacting positively develop symptoms of syphilis; on the other hand, the majority reacting negatively remain healthy. An examination of the mother alone does not warrant an absolute definite prognosis for the child. In general, it may be said that a positive reaction does not constitute a favorable prognostic sign for a child.

In untreated congenital syphilis of children of one year and over, the Wasserman reaction is positive in 97 to 100 per cent. of cases. The clinical manifestations may be quite varied and clinically ill defined, so that the serum reaction possesses considerable diagnostic value. In most cases the reactions are strong and while active treatment may improve local lesions, it is very difficult indeed to secure a negative reaction.

In congenital mental deficiency and epilepsy, the Wasserman reaction shows that syphilis plays a larger part in the etiology of this condition than is generally supposed.

The Effect of Treatment Upon the Wasserman Reaction.—Whether the treatment be mercury, iodides, or the substitutes for salvarsan, we must always bear in mind that one treatment will not suffice, two treatments will not cure, and so on; but that the entire course of treatment must depend upon the symptoms, that the Wasserman reaction is the most constant and delicate single symptom of syphilis, and whenever a serum is found to act positively, anti-syphilitic treatment is indicated and should be persisted in until the reaction becomes negative and remains so for a sufficiently prolonged period of observation. It is believed that a persistently positive reaction indicates the presence of living spirochetes and that treatment should be continued until the blood acts negatively. In former days there were hard and fast rules for treatment, but these are not sufficient.

As the Wasserman reaction is the most delicate symptom and the last to disappear, treatment should be continued until the reaction disappears entirely and permanently. It has been abundantly proved, however, that in syphilis a single negative reaction is not sufficient or definite evidence that a cure has been effective, for the disease may recur after treatment is discontinued, at least, to the extent that the Wasserman reaction reappears followed by clinical manifestations. It is necessary, therefore, that successive examinations be made during a period of at least two years, and off and on during the remainder of life.

In cases of tertiary syphilis, at least, it is advisable to examine the spinal fluid and continue treatment in case it shows a positive reaction, even if the blood serum is negative.

In every case the object should not be, simply to dissipate the external and obvious lesions, but to continue the treatment until there is, first, a continued absence of symptoms; second, a permanent negative Wasserman reaction.

A single negative reaction is a satisfactory indication of the progress of treatment, but it does not signify that a permanent cure has been effective; nor that a patient is free from all spirochetes, for, in some cases, the clinical symptoms may recur after the treatment has been suspended, but the Wasserman reaction is the first symptom to reappear and is the earliest indication of an impending lesion. One fact is to be clearly emphasized, namely, that the earlier energetic treatment is begun, the more likely it is that a permanent cure will be effected.

Persistently positive reactions during treatment would indicate that more active measures or a change in therapy are needed. A positive reaction, after treatment has been discontinued, is an indication for its resumption.

The following questions are asked: Does a positive reaction invariably indicate the presence of living spirochetes? May the reaction remain positive for an indefinite time after the patient has been cured, just as agglutinins and antitoxins may persist in the blood for some time, after recovery from typhoid fever or diphtheria has taken place?

The sum total of the experience of investigators from all parts of the world would indicate that a persistently positive reaction means the presence of living spirochetes somewhere in the body. Lesions may not be active; the patient while clinically healthy may be infective, and is always subject to possible recurrences of clinical syphilis.

METHODS OF REPORTING THE WASSERMAN

++++	Strongly positive	100%
+++	Moderately positive	75%
++	Weakly positive	50%
+	Very weakly positive	25%
±	(Plus minus) Doubtful reaction, less than	25%
—	Negative.	

ONE HALF HOUR: A TRUE STORY

By Maude Muse, R.N.
San Francisco, Calif.

Four staccato taps of the little bell on the head nurse's desk.

The youngest Junior peeked at her wrist watch as she slid a kidney basin and rubber catheter into the sterilizer, and said to the ward maid who was cleaning the work room: "Twelve-thirty. That's probably to tell me to go to luncheon, but I'll slip back and finish here, so don't you turn off the gas." True to her training, she gathered up the dressing trays to leave them on the "supply shelf" as she passed, and reported at the desk.